CONTENTS OF VOLUME 33

Number 1

Yousef A. G. Abdalla and B. S. Attili	1	Daily and hourly wind speed distribution in Bahrain
P. B. L. Chaurasia	7	Comparative study of insulating materials in solar water storage systems
E. A. Jackson and F. O. Akuffo	13	Correlations between monthly average daily global irradiation and relative duration of sunshine at Kumasi
Greg Schoenau, Al Lumbis and Robert Besant	23	An examination of operating strategies for energy efficient operation of attached sunspaces in cold climates
S. N. Sharan and T. C. Kandpal	37	Testing of a prototype combined photovoltaic–thermal linear Fresnel concentrator–receiver system
Josua P. Meyer and Gideon P. Greyvenstein	41	Influence of price changes on the viability of heat pumps for heating water in South African homes
Ho-Ming Yeh and Chen-Yen Cheng	51	Cool thermal storage by vacuum freezing of water with constant volume rate of sublimation
Won Y. Lee and Sang S. Kim	59	Finite time optimization of a Rankine heat engine
Victor O. Aimiuwu	69	Evaporative cooling of water in hot arid regions
Corrigendum	75	
Software Survey Section	I	

Number 2

J. Prakash, H. P. Garg and D. S. Hrishikesan	77	Performance of a solar collector with refrigerant as working fluid
Asim K. Sen	83	The momentum turbine: design and analysis of an experimental model
S. J. Venter and D. G. Kröger	89	The effect of tip clearance on the performance of an axial flow fan
Rajindar K. Koshal, Manjulika Koshal and Kahandas Nandola	99	Production and high energy prices: a case of India

M. I. James, M. L. Mittal, G. P. Gupta and V. K. Rohatgi — 105 — Interelectrode current leakage in Faraday generators

M. Sh. El-Deen Mohamedein, Labib Iskandar and I. A. Kholeif — 109 — Thermal effect on diffusion between concentric cylinders

S. Ahmed and Taher Abuain — 117 — Global solar radiation climate of Libya

S. Sinha and G. N. Tiwari — 125 — Theoretical evaluation of commercial solar hot water system for constant delivery temperature

Josua P. Meyer and Gideon P. Greyvenstein — 135 — Hot water for large residential units, hospitals and laundries with heat pumps in South Africa: a techno-economic analysis

S. K. Sharma, B. P. S. Sethi and Suneeta Chopra — 145 — Kinetic and thermophysical studies of acetamide–sodium bromide eutectic for low temperature storage applications

Larry Hughes and Sandy Scott — 151 — Using hydrogen from hydro-electricity to alleviate carbon dioxide emissions in eastern Canada

Software Survey Section — I

Number 3

P. I. Ekwo and C. E. Okeke — 159 — Thermoelectric properties of the PbS–ZnS alloy semiconductor and its application to solar energy conversion

T. Ayhan, Ö. Çomakli and K. Kaygusuz — 165 — Experimental investigation of the exergetic efficiency of solar assisted and energy storage heat pump systems

A. I. Dounis, M. J. Santamouris and C. C. Lefas — 175 — Implementation of Artificial Intelligence techniques in thermal comfort control for passive solar buildings

A. Chakraverty and S. K. Das — 183 — Development of a two-directional air flow paddy dryer coupled with an integrated array of solar air heating modules

A. Thomas — 191 — Operation and performance of the solar steam generation system installed at the Government Silk Factory, Mysore

S. C. Tripathy, D. Kumar, R. Balasubramanian and T. S. Bhatti — 197 — Design and fabrication of a d.c. chopper for energy conservation in d.c. drives

A. K. Singh and G. N. Tiwari — 207 — Performance study of double effect distillation in a multiwick solar still

M. B. BELLO and A. S. SAMBO 215 Simulation studies on pipe spacings for a collector and tank sizes for a solar water heater

Software Survey Section I

Number 4

AZMI KAYA and MARION A. KEYES 225 Methods of energy efficient control and optimization for combined-cycle cogeneration

N. K. BANSAL and D. BUDDHI 235 An analytical study of a latent heat storage system in a cylinder

S. C. TRIPATHY 243 Simulation of flywheel energy storage system for city buses

Z. STARÝ 251 Temperature–thermal conditions and the geometry of Peltier elements—I

YOUSEF A. G. ABDALLA and SHAMSUL HAQUE ALVI 257 A study of wind profiles and friction layers in Bahrain

R. K. JHA, C. CHOUDHURY, H. P. GARG and Z. H. ZAIDI 263 Performance prediction of a solar heated house

R. B. GANGADHAR and N. D. KAUSHIKA 275 Spectral response of graded base solar cells

CHIH WU 279 Optimal power from a radiating solar-powered thermionic engine

Software Survey Section I

Number 5–8

PROCEEDINGS OF THE FIRST INTERNATIONAL CONFERENCE ON CARBON DIOXIDE REMOVAL

Introduction ix

SECTION 1. GENERAL

J. G. M. ALDERS 283 Opening speech on the occasion of the First International Conference on Carbon Dioxide Removal

SERGIO F. GARRIBBA 287 IEA perspectives on the global climate change issue

C.-D. SCHÖNWIESE 297 Recent developments in scientific knowledge on climate change

P. VELLINGA 305 International policy development on climate change

MEYER STEINBERG	311	History of CO_2 greenhouse gas mitigation technologies

SECTION 2. CO_2-RECOVERY

T. SUDA, M. FUJII, K. YOSHIDA, M. IIJIMA, T. SETO and S. MITSUOKA	317	Development of flue gas carbon dioxide recovery technology
M. A. WILSON, R. M. WRUBLESKI and L. YARBOROUGH	325	Recovery of CO_2 from power plant flue gases using amines
R. BARCHAS and R. DAVIS	333	The Kerr-McGee/ABB Lummus Crest technology for the recovery of CO_2 from stack gases
M. T. SANDER and C. L. MARIZ	341	The Fluor Daniel ECONAMINE FG process: past experience and present day focus
T. YAGI, H. SHIBUYA and T. SASAKI	349	Application of chemical absorption process to CO_2 recovery from flue gas generated in power plants
M. SCHÜTZ, M. DAUN, P.-M. WEINSPACH, M. KRUMBECK and K. R. G. HEIN	357	Study on the CO_2-recovery from an ICGCC-plant
D. JANSEN, A. B. J. OUDHUIS and H. M. VAN VEEN	365	CO_2 reduction potential of future coal gasification based power generation technologies
R. J. ALLAM and C. G. SPILSBURY	373	A study of the extraction of CO_2 from the flue gas of a 500 MW pulverised coal fired boiler
S. NAKAYAMA, Y. NOGUCHI, T. KIGA, S. MIYAMAE, U. MAEDA, M. KAWAI, T. TANAKA, K. KOYATA and H. MAKINO	379	Pulverized coal combustion in O_2/CO_2 mixtures on a power plant for CO_2 recovery
C. A. HENDRIKS and K. BLOK	387	Carbon dioxide recovery using a dual gas turbine IGCC plant
J. DE RUYCK	397	Efficient CO_2 capture through a combined steam and CO_2 gas turbine cycle
E. I. YANTOVSKII, K. N. ZVAGOLSKY and V. A. GAVRILENKO	405	Computer exergonomics of power plants without exhaust gases
S. SAHA and A. CHAKMA	413	Separation of CO_2 from gas mixtures with liquid membranes
P. H. M. FERON, A. E. JANSEN and R. KLAASSEN	421	Membrane technology in carbon dioxide removal
J. P. VAN DER SLUIJS, C. A. HENDRIKS and K. BLOK	429	Feasibility of polymer membranes for carbon dioxide recovery from flue gases
K. YAMADA, K. KONISHI, O. OKADA and M. STEINBERG	437	Evaluation of hydrocarb process for CO_2 removal

ROBERT H. BORGWARDT	443	A technology for reduction of CO_2 emissions from the transportation sector
W. SEIFRITZ	451	Partial and total reduction of CO_2-emissions of automobiles using CO_2-traps
S. H. GOLDTHORPE, P. J. I. CROSS and J. E. DAVISON	459	System studies on CO_2 abatement from power plants
O. BOLLAND and S. SÆTHER	467	New concepts for natural gas fired power plants which simplify the recovery of carbon dioxide
C. L. LECI and S. H. GOLDTHORPE	477	Assessment of CO_2 removal from power station flue gas
M. J. COGBILL and G. P. MARSH	487	The separation and disposal of carbon dioxide from power station flue gases

SECTION 3. UTILIZATION OF CARBON DIOXIDE

M. ARESTA, E. QUARANTA and I. TOMMASI	495	Prospects for the utilization of carbon dioxide
EDWARD S. LIPINSKY	505	R&D status of technologies for utilization of carbon dioxide
T. INUI, T. TAKEGUCHI, A. KOHAMA and K. TANIDA	513	Effective conversion of carbon dioxide to gasoline
H. ARAKAWA, J.-L. DUBOIS and K. SAYAMA	521	Selective conversion of CO_2 to methanol by catalytic hydrogenation over promoted copper catalyst
K. FUJIMOTO, K. OMATA, T. NOZAKI, O. YAMAZAKI and Y. HAN	529	Selective synthesis of liquid hydrocarbons from carbon dioxide and methane
M. SPECHT, A. BANDI, C. U. MAIER and J. SCHWARZ	537	Energetics of solar methanol synthesis from atmospheric carbon dioxide compared to solar liquid hydrogen generation
Y. WATANABE, N. OHMURA and H. SAIKI	545	Isolation and determination of cultural characteristics of microalgae which functions under CO_2 enriched atmosphere
NOBUYUKI NISHIKAWA, KOYU HON-NAMI, ATSUSHI HIRANO, YOSHIAKI IKUTA, YOSHINORI HUKUDA, MASAAKI NEGORO, MASATO KANEKO and MICHIO HADA	553	Reduction of carbon dioxide emission from flue gas with microalgae cultivation
G. YUN and M. ZHAO	561	A primary practice in recovery of carbon dioxide for water and wastewater treatment
H. E. DUNSMORE	565	A geological perspective on global warming and the possibility of carbon dioxide removal as calcium carbonate mineral

Yutaka Tamaura and Ken'ichi Nishizawa — 573 — CO_2 decomposition into C and conversion into CH_4 using the H_2-reduced magnetite

SECTION 4. ENHANCED OIL RECOVERY/UNDERGROUND STORAGE OF CO_2

P. L. Bondor — 579 — Applications of carbon dioxide in enhanced oil recovery

S. Tanaka, T. Hakuta and H. Haino — 587 — Possible contribution of carbon dioxide flooding to global environmental issues

T. Holt and E. Lindeberg — 595 — Thermal power—without greenhouse gases and with improved oil recovery

M. J. van der Burgt, J. Cantle and V. K. Boutkan — 603 — Carbon dioxide disposal from coal-based IGCC's in depleted gas fields

L. G. H. van der Meer — 611 — Investigations regarding the storage of carbon dioxide in aquifers in The Netherlands

H. Koide, Y. Tazaki, Y. Noguchi, S. Nakayama, M. Iijima, K. Ito and Y. Shindo — 619 — Subterranean containment and long-term storage of carbon dioxide in unused aquifers and in depleted natural gas reservoirs

SECTION 5. OCEAN DISPOSAL OF CO_2

T. R. S. Wilson — 627 — The deep ocean disposal of carbon dioxide

H. J. W. De Baar — 635 — Options for enhancing the storage of carbon dioxide in the oceans: a review

A. Saji, H. Yoshida, M. Sakai, T. Tanii, T. Kamata and H. Kitamura — 643 — Fixation of carbon dioxide by clathrate-hydrate

Nobuyuki Nishikawa, Masao Morishita, Motoshi Uchiyama, Fumihiko Yamaguchi, Kiyohito Ohtsubo, Harushi Kimuro and Ryuzo Hiraoka — 651 — CO_2 clathrate formation and its properties in the simulated deep ocean

T. Austvik and K. P. Løken — 659 — Deposition of CO_2 on the seabed in the form of hydrates

C. R. Liro, E. E. Adams and H. J. Herzog — 667 — Modeling the release of CO_2 in the deep ocean

D. S. Golomb, S. G. Zemba, J. W. H. Dacey and A. F. Michaels — 675 — The fate of CO_2 sequestered in the deep ocean

T. Ohsumi, N. Nakashiki, K. Shitashima and K. Hirama — 685 — Density change of water due to dissolution of carbon dioxide and near-field behavior of CO_2 from a source on deep-sea floor

Masao Morishita and Gilbert R. Stegen	691	Jet mixing model of CO_2 injected into a deep ocean
H. Drange and P. M. Haugan	697	Carbon dioxide sequestration in the ocean: the possibility of injection in shallow water

SECTION 6. COMPARISONS WITH OTHER CO_2 MITIGATION OPTIONS

Ronald H. Wolk and John McDaniel	705	High efficiency coal fueled power generation
J. S. Summers	713	Reduction of carbon dioxide emissions through efficiency improvements in IGCC electrical power generation
D. O. Hall, J. Woods and J. House	721	Biological systems for uptake of carbon dioxide
S. B. Alpert, D. F. Spencer and G. Hidy	729	Biospheric options for mitigating atmospheric carbon dioxide levels
P. A. Okken, P. Lako, D. Gerbers, T. Kram and J. R. Ybema	737	CO_2 removal in competition with other options for reducing CO_2 emissions
S. C. Morris, J. Lee, G. Goldstein and M. Steinberg	747	Comparison of pre- and post-combustion carbon removal
R. Matsuhashi and H. Ishitani	755	Modification of energy system and CO_2 disposal for reducing CO_2 economically
Sabine Messner and Nebojša Nakićenović	763	A comparative assessment of different options to reduce CO_2 emissions

SECTION 7. IMPLEMENTATION OF CARBON DIOXIDE REMOVAL

Y. Shindo, T. Hakuta and H. Miyama	773	The present status of carbon dioxide removal in Japan
Olav Kaarstad	781	Emission-free fossil energy from Norway
John F. Legg	787	Overview of carbon dioxide removal and disposal in Canada
A. Chakma	795	CO_2 separation and recycling—a route to zero net production of CO_2 in the Alberta energy industry
J. M. Topper, C. J. Bower, I. R. Summerfield and I. S. C. Hughes	803	The British Coal Global Warming R&D Programme
A. R. Jack, H. Audus and P. W. F. Riemer	813	The IEA Greenhouse Gas R&D Programme
W. C. Turkenburg	819	CO_2 removal; some conclusions
Sergio F. Garribba	825	Closing address

Number 9

DUMITRU ONEA and MIRCEA CÂRDU	827	Romanian power equipment for microhydroelectric and thermal power plants
MAHMOUD S. AUDI	833	Experimental study of a solar space heating model using Jordanian rocks for storage
W. W. MARR, W. J. WALSH and P. C. SYMONS	843	Modeling battery performance in electric vehicle applications
W. W. MARR and W. J. WALSH	849	Life-cycle cost evaluations of electric/hybrid vehicles
J. P. MITTAL, B. S. BHULLAR, S. D. CHHABRA and O. P. GUPTA	855	Energetics of wheat production in two selected villages of Uttar Pradesh in India
ASIM K. SEN	867	The speed control of a momentum turbine
I. INOUE, M. ISHIKAWA and J. UMOTO	873	Numerical study of arc phenomena in boundary layer on MHD generator
M. CÂRDU and I. CHEBELEU	885	Sun thermotechnics achievements in the field of cold technique and the drying of agricultural farm products
AGHAREED M. TAYEB	889	Performance study of some designs of solar stills
Software Survey Section	I	

Number 10

T. V. RAMACHANDRA and D. K. SUBRAMANIAN	899	Energy efficiencies of end-use devices in an electro-metallurgical industry: a critical study
SURENDRA SINGH, V. K. MITTAL, MADHU P. SINGH and B. S. BHANGOO	913	Energy requirements for cultivation of maize–wheat crop rotation in selected agro-climatic zones of Punjab
C. S. RANI, T. C. KANDPAL and S. C. MULLICK	919	Preliminary study of water boiling test procedures used for performance evaluation of fuelwood cook-stoves
ROY BOYD and RAJINDAR K. KOSHAL	931	Potential changes in world oil prices on the U.S.: a general equilibrium perspective
WARREN RICE and GEORGE C. BEAKLEY	943	Characteristics of the hydraulic refrigeration system (HRS) using *n*-butane as the refrigerant
YOSHITAKA INUI, KENJI MORIMOTO, MOTOO ISHIKAWA and JURO UMOTO	951	Active and reactive power control of Faraday type MHD generator using new power consolidation–inversion-control system
K. M. BROWNE	963	Comments on "A Scheme for Generating Electricity Using Gravitational Energy"
Software Survey Section	I	

Number 11

J. PRAKASH, H. P. GARG and RATNA VERMA	965	Study of the thermal performance of a multiple pass solar collector
V. BĂDESCU	971	A study concerning the opportunity of solar power generation in south-east Romania (Dobrogea)
UPAMA MISRA, SANJAY SINGH, AMARIKA SINGH and G. N. PANDEY	983	A new temperature controlled digester for anaerobic digestion for biogas production
J. PRAKASH, H. P. GARG, RANJANA JHA and D. S. HRISHIKESAN	987	Solar thermal systems with transparent insulation
R. KARABACAK	997	The effects of fin parameters on the radiation and free convection heat transfer from a finned horizontal cylindrical heater
S. V. BOPSHETTY, J. K. NAYAK and S. P. SUKHATME	1007	Performance analysis of a solar concrete collector
M. CÂRDU and L. DRAGOŞ	1017	Achievements in the field of fluidized bed firing boilers
LIN WENXIAN and LU ENRONG	1021	Annual and seasonal global solar radiation climates in Yunnan, China
Software Survey Section	I	

Number 12

P. R. KRISHNAMOORTHY, S. SEETHARAMU and M. SIDDHARTHA BHATT	1031	Optimal heat extraction from an updraft biomass reactor
STIG-INGE GUSTAFSSON and BJÖRN G. KARLSSON	1051	Heat accumulators in CHP networks
S. C. TRIPATHY, M. KALANTAR and R. BALASUBRAMANIAN	1063	Dynamics and stability of a hybrid wind–diesel power system
S. C. TRIPATHY, M. C. ROY and R. BALASUBRAMANIAN	1073	Energy auditing kit for cement industries
B. MOHANTY and K. N. MANANDHAR	1079	Software development for energy analysis and heat recovery from boilers and furnaces
A. ANGHEL and M. CÂRDU	1089	Preoccupations for wind energy conversion

Technical Note
GLADIUS LEWIS 1097 An empirical relation for estimating global irradiation for Tennessee, U.S.A.

Software Survey Section I